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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/660,167	09/11/2003	Paul Reuben Day	ROC920030144US1	7591
30206 7590 03/22/2007 IBM CORPORATION ROCHESTER IP LAW DEPT. 917 3605 HIGHWAY 52 NORTH ROCHESTER, MN 55901-7829			EXAMINER PHAM, MICHAEL	
			ART UNIT 2167	PAPER NUMBER
SHORTENED STATUTORY PERIOD OF RESPONSE			MAIL DATE	DELIVERY MODE
3 MONTHS			03/22/2007	PAPER,

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/660,167	<b>Applicant(s)</b> DAY ET AL.	
	<b>Examiner</b> Michael D. Pham.	<b>Art Unit</b> 2167	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 13 December 2006.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-23 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-23 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                       | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

**Detailed Action**

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 12/13/2006 has been entered.

**Claim Objections**

2. Claims 1, 7, and 15 are objected to because of the following informalities: Claims 1, 7, and 15 recite several instances of the phrase "wherein" which suggests or makes optional but does not require the steps to be performed or does not limit a claim to a particular structure. See MPEP 2111.04. Limitations, as is, are not being positively claimed. The examiner respectfully suggests removing this phrase, to more positively claim the limitation.

*It is noted that although limitations have little patentable weight, claims have been interpreted in anticipation of a more positively claimed limitation.*

3. Claims 19 and 21-23 are objected to because of the following informalities: Claims 19 and 21-23 recite the phrase "configured to" which suggests or makes optional but does not require the steps to be performed or does not limit a claim to a particular structure. See MPEP 2111.04. Limitations, as is, are not being positively claimed. The examiner respectfully suggests removing this phrase, to more positively claim the limitation.

*It is noted that although limitations have little patentable weight, claims have been interpreted in anticipation of a more positively claimed limitation.*

4. Claim 1 is objected to because of the following informalities: Claim 1 recites the alleged word “selectably”. It is undeterminable of what applicant’s mean by the term “selectably”. Appropriate correction is required.

***Claim Rejections - 35 USC § 101***

5. 35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

6. Reconsideration of claims 1-6 has been made. Claims 1-6 are rejected under 35 U.S.C. 101 for the reasons set forth below.

From MPEP 2106:

**a) "USEFUL RESULT"**

**For an invention to be “useful” it must satisfy the utility requirement of section 101. The USPTO’s official interpretation of the utility requirement provides that the utility of an invention has to be (i) specific, (ii) substantial and (iii) credible. MPEP § 2107 and *Fisher*, 421 F.3d at 1372, 76 USPQ2d at 1230 (citing the Utility Guidelines with approval for interpretation of “specific” and “substantial”). In addition, when the examiner has reason to believe that the claim is not for a practical application that produces a useful result, the claim should be rejected, thus requiring the applicant to distinguish the claim from the three 35 U.S.C. 101 judicial exceptions to patentable subject matter by specifically reciting in the claim the practical**

**application. In such cases, statements in the specification describing a practical application may not be sufficient to satisfy the requirements for section 101 with respect to the claimed invention. Likewise, a claim that can be read so broadly as to include statutory and nonstatutory subject matter must be amended to limit the claim to a practical application. In other words, if the specification discloses a practical application of a section 101 judicial exception, but the claim is broader than the disclosure such that it does not require a practical application, then the claim must be rejected.**

Claims 1-6 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter. Claims 1-6 do not provide a useful, concrete, and tangible result that is used to implement the method so as to realize its functionality. Thus, claims 1-6 are merely an abstract idea and are being processed without links to a practical result in the technological arts and without a practical application. Claim 1 lacks a useful, concrete, and tangible result because there is a description of only executing the query. It is noted that claim 1 does recite executing the query, however does not claim any result of the query. Further although an advantage of the present invention is the ability to enable records to be retrieved and a result set to begin being assembled prior to fully building the bitmap; no result set/ retrieval of records has been claimed. All other claims fail to resolve the deficiencies of claim 1, and are therefore rejected. Claim 6, nearly claims a result of a query; however it does not make clear that it will always return a result and is therefore is also indefinite.

#### ***Claim Rejections - 35 USC § 102***

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

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(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

8. Claims 1-13 and 15-23 are rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent 5560007 by Thai (hereafter Thai).

**Claim 1:**

Thai discloses the following claimed limitations:

**“executing the query on a plurality of table entries in a table using a bitmap having a respective element associated with each table entry”** [Col. 9 lines 63-67, bitmaps are associated with records in a table during query execution.]; **and**

**“concurrently with executing the query”** [Col. 20 lines 34-40, determining if search query criteria (e.g. filter conditions) is met (e.g. in doing so it is executing the query). Col. 20 lines 60-61, updating bitmaps while retrieving records.], **“generating the bitmap by initially setting a plurality of elements to an active value and selectably setting respective elements that are associated with entries that do not satisfy a portion of the query to an inactive value”**[Col. 20 lines 34-40, the system initializes the bitmask for this group to 1. Col. 9 lines 63-65, If there is no index, the system still creates a bitmap; each bit is set to 1. As the table is scanned, records determined to not meet the query condition are removed from the bitmask (e.g. their corresponding bit is toggled from 1 to 0). ];

**“wherein executing the query includes accessing the bitmap before at least one element is set to an inactive value during generation of the bitmap to determine whether to retrieve a table entry among the plurality of table entries”**[Col. 11 lines 2-7, Once a record is retrieved, however, the system may determine whether to filter-out the record; a bitmap may be updated

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accordingly. Col. 9 lines 63-67 to col. 10 lines 1-4, As the table is scanned, records determined to not meet query condition are removed from the bitmask. Thus, on subsequent queries the system may restrict itself to those records remaining in the set.], **wherein selectably setting respective elements that are associated with entries that do not satisfy the portion of the query to an inactive value includes setting a respective element associated with a first table entry that does not satisfy the portion of the query to the inactive value prior to retrieving the first table entry in connection with executing the query using the bitmap** [col. 3 lines 1-6, that a first portion part of a query may be determined for the first part of a bitmap, while the second portion of the query may be determined for the second part of the bitmap], **and wherein executing the query includes avoiding retrieval of the first table entry when executing the query using the bitmap after the respective element associated with the first table entry is set to the inactive value** [Col. 10 lines 2-4, the system may restrict itself to those records remaining in the set].

**Claim 2:**

**The method according to claim 1, further comprising the step of: avoiding retrieval of a table entry after its corresponding bitmap element is set to an inactive value** [Col. 9 lines 66-67 to Col. 10 lines 1-4, records determined not to meet query conditions are removed from the bitmask (e.g. their corresponding bit is toggled from 1 to 0). Thus, on subsequent query operations performed for the expression, the system may restrict itself to those records remaining in the set. Col. 11 lines 5-6, the filtered out record will no longer be accessed as long as the filter remains active.]



**Claim 3:**

**The method according to claim 1, further comprising the steps of: building an index over a column of the table [Col. 20 lines 35-40, figure 5C. Col. 9 lines 60-67. creating bitmap index. Figure 5C discloses index over a column of the table]; and determining whether each table entry satisfies the portion of the query based on the index [Col. 9 lines 65-67 to col. 10 lines 1-5, scans the records and determines whether each table entry satisfies the portion of the query based on the index.].**

**Claim 4:**

**The method according to claim 3, further comprising the steps of: scanning the table according to a first order when executing the query [Thai, Col. 9 lines 66-67 to Col. 10 lines 1-2, scans a table when executing a query.]; and scanning the index according to a second order when determining whether each table entry satisfies the portion of the query[Thai, Col. 10 lines 2-4. On subsequent query operations performed for the expression the system may restrict itself to those records remaining in the set. That is, it scans the bitmapped index to determine whether the portion of the query satisfied table entries].**

**Claim 5:**

**The method according to claim 1, further comprising the steps of: retrieving a particular table entry having its corresponding bitmap element set to an active value[Thai, Col. 9 lines 63-65, Scans table entries set to an active value ]; and determining if the particular table entry satisfies the query[Thai, Col. 9 lines 66-67 to Col. 10 lines 1-2, If it does not satisfy**



change the 1 to a 0.]..

**Claim 6:**

**The method according to claim 5, further comprising the step of: returning, as part of a result set, the particular table entry if it satisfies the query [Thai, Col. 1 lines 19-22, queries information.].**

**Claim 7:**

**A method for executing a query that evaluates one or more records of a table according to predetermined selection criteria, comprising the steps of:**

**initializing a bitmap wherein each element of the bitmap corresponds to a record of the table and each element is initialized to an active value[Col. 9 lines 63-65, if there is no index the system still creates a bitmap; each bit is set equal to 1. As the table is scanned, records determined to not meet the query condition are removed from the bitmask.];**

**running a first task that individually retrieves each of the one or more records from storage according to whether the corresponding element of the bitmap has an active value[Col. 11 lines 2-7, Once a record is retrieved, however, the system may determine whether to filter-out the record; a bitmap may be updated accordingly. Col. 20 lines 34-40, as each record is actually read (e.g. retrieve) determining if search query criteria (e.g. filter conditions) is met (e.g. in doing so it is during executing the query). Filter out equivalent to toggling the bit to 0. ];**

**running, concurrently with the first task, a second task that updates the bitmap by setting to an inactive value the respective element of the bitmap corresponding to any record that does not satisfy at least a portion of the selection criteria, wherein the first and second tasks are associated with the same query** [Col. 20 lines 60-61, updating bitmaps while retrieving records. col. 3 lines 1-6, that a first portion part of a query may be determined for the first part of a bitmap, while the second portion of the query may be determined for the second part of the bitmap]; and

**continuing to run the first task until all records from the table, having a corresponding active-value bitmap element, have been retrieved from storage**[Col. 10 lines 67 to col. 11 lines 7, all search criteria cannot be fully determined until the records are retrieved and examined. Once a record is retrieved however, the system may determine whether to filter out the record; a bitmap maybe updated accordingly.];

**wherein the first task accesses the bitmap before at least one element is set to an inactive value by the second task to determine whether to retrieve a record from storage**[Col. 11 lines 2-7, Once a record is retrieved, however, the system may determine whether to filter-out the record; a bitmap may be updated accordingly. Col. 9 lines 63-67 to col. 10 lines 1-4, As the table is scanned, records determined to not meet query condition are removed from the bitmask. Thus, on subsequent queries the system may restrict itself to those records remaining in the set.].

**Claim 8:**

**The method according to claim 7, wherein the step of running the first task includes the steps of: determining if a retrieved record satisfies the selection criteria**[Col. 9 lines 65-67 to col. 10 lines 1-5, scans the records and determines whether each table entry satisfies the portion of the query based on the index.]; **and returning, as part of a query result set, the retrieved record if the selection criteria is satisfied**[Thai, Col. 1 lines 19-22, queries information.].

**Claim 9:**

**The method according to claim 7, wherein the step of running the second task includes the steps of: scanning a column of the table using an index built over the column, wherein the portion of the selection criteria relates to record values within the column**[Col. 20 lines 35-40, figure 5C. Col. 9 lines 60-67. creating bitmap index. Figure 5C discloses index over a column of the table]; **determining a set of records whose record values within the column do not satisfy the portion of the selection criteria**[As the table is scanned, records determined to not meet the query condition are removed from the bitmask (e.g. their corresponding bit is toggled from 1 to 0).]; **and changing the respective corresponding bitmap element to an inactive value for each record within the set of records**[As the table is scanned, records determined to not meet the query condition are removed from the bitmask (e.g. their corresponding bit is toggled from 1 to 0).].

**Claim 10:**

**The method according to claim 7, wherein the step of running a first task includes the step of: discarding any record having a corresponding bitmap element which has an inactive**

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**value, by not retrieving that record from storage**[Col. 9 lines 66-67 to Col. 10 lines 1-4, records determined not to meet query conditions are removed from the bitmask (e.g. their corresponding bit is toggled from 1 to 0). Thus, on subsequent query operations performed for the expression, the system may restrict itself to those records remaining in the set. Col. 11 lines 5-6, the filtered out record will no longer be accessed as long as the filter remains active.].

**Claim 11:**

**The method according to claim 7, further comprising the step of: optimizing a query plan for the query by labeling the query as a candidate for dynamic bitmap updating**[Thai, Col. 4 lines 21-24, On the fly updating bitmaps for filtered conditions (i.e. dynamically update bitmaps based on queried conditions)].

**Claim 12:**

**The method according to claim 11, further comprising the step of: before initializing the bitmap and starting the first task and second task, determining if the query is labeled as a candidate for dynamic bitmap updating**[Thai, Col. 4 lines 9-11, optimization module employs one or more existing indices for optimizing data access.].

**Claim 13:**

**The method according to claim 9, wherein a first order in which the one or more records is retrieved differs from a second order in which the column of the table is scanned**[Thai, col. 11 lines 5-7, On subsequent operations the filtered out record will no longer be accessed (again

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as long as that filter remains active).].

**Claim 15:**

**A computer-readable medium bearing instructions for reducing input/output activity while executing a query, said instructions being arranged, upon execution thereof, to cause one or more processors to perform the steps of:**

**executing the query on a plurality of table entries in a table using a bitmap having a respective element associated with each table entry**[Col. 9 lines 63-67, bitmaps are associated with records in a table during query execution.]; and

**concurrently with executing the query**[Col. 20 lines 34-40, determining if search query criteria (e.g. filter conditions) is met (e.g. in doing so it is executing the query). Col. 20 lines 60-61, updating bitmaps while retrieving records.], **generating the bitmap by initially setting a plurality of elements to an active value, and selectably setting respective elements that are associated with entries that do not satisfy a portion of the query to an inactive value** [Col. 20 lines 34-40, the system initializes the bitmask for this group to 1. Col. 9 lines 63-65, If there is no index, the system still creates a bitmap; each bit is set to 1. As the table is scanned, records determined to not meet the query condition are removed from the bitmask (e.g. their corresponding bit is toggled from 1 to 0). ];

**wherein executing the query includes accessing the bitmap before at least one element is set to an inactive value during generation of the bitmap to determine whether to retrieve a table entry among the plurality of table entries** [Col. 11 lines 2-7, Once a record is retrieved, however, the system may determine whether to filter-out

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the record; a bitmap may be updated accordingly. Col. 9 lines 63-67 to col. 10 lines 1-4, As the table is scanned, records determined to not meet query condition are removed from the bitmask. Thus, on subsequent queries the system may restrict itself to those records remaining in the set.], **wherein selectably setting respective elements that are associated with entries that do not satisfy the portion of the query to an inactive value includes setting a respective element associated with a first table entry that does not satisfy the portion of the query to the inactive value prior to retrieving the first table entry in connection with executing the query using the bitmap** [col. 3 lines 1-6, that a first portion part of a query may be determined for the first part of a bitmap, while the second portion of the query may be determined for the second part of the bitmap], **and wherein executing the query includes avoiding retrieval of the first table entry when executing the query using the bitmap after the respective element associated with the first table entry is set to the inactive value** [Col. 10 lines 2-4, the system may restrict itself to those records remaining in the set].

**Claim 16:**

**The computer-readable medium according to claim 15, bearing additional instruction, said additional instructions being arranged, upon execution thereof, to cause one or more processors to perform the steps of: avoiding retrieval of a table entry after its corresponding bitmap element is set to an inactive value** [Col. 9 lines 66-67 to Col. 10 lines 1-4, records determined not to meet query conditions are removed from the bitmask (e.g. their corresponding bit is toggled from 1 to 0). Thus, on subsequent query operations performed for

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the expression, the system may restrict itself to those records remaining in the set. Col. 11 lines 5-6, the filtered out record will no longer be accessed as long as the filter remains active.].

**Claim 17:**

**The computer-readable medium according to claim 15, bearing additional instruction, said additional instructions being arranged, upon execution thereof, to cause one or more processors to perform the steps of: building an index over a column of the table**[Col. 20 lines 35-40, figure 5C. Col. 9 lines 60-67. creating bitmap index. Figure 5C discloses index over a column of the table]; **and determining whether each table entry satisfies the portion of the query based on the index** [Col. 9 lines 65-67 to col. 10 lines 1-5, scans the records and determines whether each table entry satisfies the portion of the query based on the index.].

**Claim 18:**

**The computer-readable medium according to claim 17, bearing further instruction, said further instructions being arranged, upon execution thereof, to cause one or more processors to perform the steps of: scanning the table according to a first order when executing the query** [Thai, Col. 9 lines 66-67 to Col. 10 lines 1-2, scans a table when executing a query.]; **and scanning the index according to a second order when determining whether each table entry satisfies the portion of the query** [Thai, Col. 10 lines 2-4. On subsequent query operations performed for the expression the system may restrict itself to those records remaining in the set. That is, it scans the bitmapped index to determine whether the portion of



the query satisfied table entries].

**Claim 19:**

**An apparatus for executing a query comprising:**

**at least one processor**[figure 1A element 101];

**a memory coupled with the at least one processor**[figure 1A element 109]; **and**

**a database engine residing in the memory and executed by the at least one processor**[Col. 6 lines 46-56], **the database engine configured to initialize each element of a bitmap, corresponding to a table, to an active value**[Col. 9 lines 63-65, if there is no index the system still creates a bitmap; each bit is set equal to 1. As the table is scanned, records determined to not meet the query condition are removed from the bitmask.];

**retrieve records of the table according to the bitmap**[Col. 11 lines 2-7, Once a record is retrieved, however, the system may determine whether to filter-out the record; a bitmap may be updated accordingly. Col. 20 lines 34-40, as each record is actually read (e.g. retrieve) determining if search query criteria (e.g. filter conditions) is met (e.g. in doing so it is during executing the query). Filter out equivalent to toggling the bit to 0. ]; **and**

**concurrently with retrieving the records, update individual elements of the bitmap according to a portion of the query, wherein the database engine is configured to access the bitmap before at least one individual element of the bitmap has been updated to determine whether to retrieve a record of the table**[Col. 11 lines 2-7, Once a record is retrieved, however, the system may determine whether to filter-out the record; a bitmap may be updated accordingly. Col. 9 lines 63-67 to col. 10 lines 1-4, As the table is scanned, records determined

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to not meet query condition are removed from the bitmask. Thus, on subsequent queries the system may restrict itself to those records remaining in the set.], **wherein the database engine is configured to set a first individual element associated with a first record that does not satisfy the portion of the query to an inactive value without retrieving the first record** [col. 3 lines 1-6, that a first portion part of a query may be determined for the first part of a bitmap, while the second portion of the query may be determined for the second part of the bitmap], **and wherein the database engine is configured to avoid retrieval of the first record when retrieving records of the table according to the bitmap after the first individual element associated with the first record is set to the inactive value** [Col. 10 lines 2-4, the system may restrict itself to those records remaining in the set].

**Claim 20:**

**The apparatus according to claim 19, wherein the bitmap includes a respective element for each record of the table**[Col. 9 lines 63-67, bitmaps are associated with records in a table during query execution.].

**Claim 21:**

**The apparatus according to claim 20, wherein the database engine is further configured to analyze the retrieved records to determine if selection criteria of the query are met** [As the table is scanned, records determined to not meet the query condition are removed from the bitmask (e.g. their corresponding bit is toggled from 1 to 0).].

**Claim 22:**

**The apparatus according to claim 21, wherein the database engine is further configured to avoid an input/output operation for any record having a corresponding bitmap element set to an inactive value** [Col. 9 lines 66-67 to Col. 10 lines 1-4, records determined not to meet query conditions are removed from the bitmask (e.g. their corresponding bit is toggled from 1 to 0). Thus, on subsequent query operations performed for the expression, the system may restrict itself to those records remaining in the set. Col. 11 lines 5-6, the filtered out record will no longer be accessed as long as the filter remains active.].

**Claim 23:**

**The apparatus according to claim 22, wherein the database engine is configured to use a pre-built index related to the portion of the query when updating individual elements of the bitmap** [Thai, Col. 3 lines 29-30, pre-existing index which supports a query].

***Claim Rejections - 35 USC § 103***

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

*10. Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Thai (U.S. Patent 5,560,007) further in view of U.S. Patent 6,757,670 by Inohara et. al. (hereafter Inohara).*

**Claim 14:**

Thai disclose the method of claim 7 and further disclose optimization methods based on indexes; however Thai does not explicitly disclose **collecting statistics related to performance of executing the query and generating a recommendation presented to a user for creating a permanent index based on the statistics.**

On the other hand, Inohara discloses presenting optimization methods from user and using statistic information in Col. 2 lines 43-60.

All inventions are directed towards query optimization. Therefore it would have been obvious to have modified Thai to include the steps of collecting statistics related to performance of executing the query and generating a recommendation presented to a user for creating a permanent index based on the statistics. A skilled artisan would have been motivated to do so for the purpose of obtaining a good execution plan for a query (Inohara, Col. 3 lines 44-46).

***Response to Arguments***

11. Applicant's arguments filed 12/13/2006 have been fully considered but they are not persuasive. Applicant's assert the following:

A. Page 9, “the results of the learning mode of Thai, however, are not used on a current query, since the decision to set elements in a bitmap to “0” values is made as the associated records have already been retrieved. It is only after the bitmap is completely constructed, and a later query attempts to use the same bitmap, that the benefits of the learning mode are realized.”

In response, the examiner respectfully disagrees. First, the results of the learning mode of Thai, can be used in a current query. E.g. see figure 5D T4. Where it is disclosed that the results of the learning mode are used in a current query. Col. 4 lines 15-20 state that one or more bitmasks may be utilized to track information. Hence if more than one bitmap is being utilized in the query, the bitmap for that query is not fully built. Secondly, Thai further discloses that in col. 3. lines 1-20 further suggest “selectably setting respective elements that are associated with entries that do not satisfy the portion of the query to an inactive value includes setting a respective element associated with a first table entry that does not satisfy the portion of the query using the bitmap” because the solution is ascertainable all without having accessed the underlying physical records. Hence, Thai also discloses that the decision to set elements in a bitmap can be made without retrieving the records. Further disclosing col. 3 lines 1-6, that a first portion part of a query may be determined for the first part of a bitmap, while the second portion of the query may be determined for the second part of the bitmap.

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B. Page 10, “because the reference does not disclose accessing the bitmap before at least one element is set to an inactive value during generation of the bitmap, since the second query in Thai is not processed until after the bitmap has already been generated.”

In response, the examiner respectfully disagrees. In col. 3 lines 1-6, it is disclosed that a first half of a query may be satisfied after a first part of a bitmap, while a second part of the query may be satisfied after a second part of a bitmap. Hence, accessing the bitmap before at least one element is set to an inactive value during generation of the bitmap is suggested, by the cited reference. This is because a first part of a query may be satisfied before a second part of the query is satisfied; hence, accessing the bitmap before at least one element is set to an inactive value.

C. Page 10, “if the two views of a range of records are considered to constitute the same query, Thai only discloses that an element in a bitmap for a record is set to an inactive value after that record has been retrieved using the bitmap.”

In response, the examiner respectfully disagrees. See figure, 5D, T4. Where it is that the bitmap for the record is set to an inactive value before that record has been retrieved using the bitmap.

D. Page 10, “Thai does not disclose that within any given query an element in a bitmap corresponding to a record or table entry is set to an inactive value prior to the corresponding

record or table entry being retrieved using the bitmap, and that as a result of that element being set to the inactive value, retrieval of the record or table entry using the bitmap is avoided.”

In response, the examiner respectfully disagrees. Thai does disclose that within any given query an element in a bitmap corresponding to a record or table entry is set to an inactive value prior to the corresponding record or table entry being retrieved using the bitmap. In Col. 3 lines 1-20, it is disclosed that a first half of a query is found by using a bitmask, further disclosing that that bitmask was set without having accessed the underlying physical records, and that the second half of the query is respectively found in a similar manner. Hence, Thai suggests that “within any given query an element in a bitmap corresponding to a record or table entry is set to an inactive value prior to the corresponding record or table entry being retrieved using the bitmap”. Thai also further suggests that within a given query an element in a bitmap corresponding to a record or table entry is set to an inactive value prior to the corresponding record or table entry being retrieved using the bitmap in figure 5d, t4. Where it is further disclosed that a bitmap is set prior to retrieval of a record.

E. Page 10, “Thai requires that a record actually be retrieved using the bitmap before its corresponding element can be set to an inactive value. In contrast, claim 1 enables the elements in a bitmap corresponding to some records or table entries to be set to inactive values prior to those records or table entries ever being retrieved using the bitmap.”



In response, the examiner respectfully disagrees. Thai col. 3 lines 1-20 disclose that bitmaps are able to be set prior to those records or table entries ever being retrieved using the bitmap. I.e. a solution is ascertainable all without having accessed the underlying physical records. This is done by utilizing bitmap solutions being set for a query. Thai discloses that a first half of a query may be determined, and as well a second half of a query to be determined by bitmap solutions. That these bitmap solutions are created before retrieving the records. Furthermore, Thai may also disclose this another way in that of figure 5d, where T4 is a current query utilizing an already set bitmap (i.e. bitmap corresponding to records set inactive prior to those records ever being retrieved using the bitmap).

F. Page 11 referring to prior statement, “no evidence has been presented that establishes that one of ordinary skill in the art would be motivated to modify Thai to incorporate any such functionality.”

In response the examiner respectfully disagrees. Thai's reference does suggest evidence that a bitmap maybe set before actually retrieving the record. In fact, in the Thai reference there are two pieces of substantial evidence. The first being that Thai discloses that a bitmap may be set before retrieval of records (col. 3 lines 1-20). The second being the fact that Thai, figure 5D may make a query that has already set the bitmap prior to retrieval of a record. Hence evidence is present in the cited disclosure. Furthermore, parallel processing is not new, another way to look at this problem is to thread or fork a process, which is well known in the computer art.

G. Page 11, That “there is otherwise no disclosure or suggestion in the reference that multiple tasks could be used for these different operations”.

In response, the examiner respectfully disagrees. Thai, col. 3 lines 1-20, discloses that when executing a query, a first half of a query and a second half of a query is processed, hence multiple tasks in the same query.

H. Page 11, “the first and second tasks are associated with the same query”

In response, the examiner respectfully disagrees. Thai discloses that it is possible to have more than one task for one query (col. 3 lines 1-20).

I. Page 12, “Thai does not disclose any embodiment where the updating of a bitmap is a separate operation from the retrieval of records. In fact, the updating of a bitmap is performed specifically based upon the retrieval of records.”

In response, the examiner respectfully disagrees. Thai, col. 3 lines 1-20 discloses that updating a bitmap is done separate from the retrieval of records. That is to say, the bitmap is determined without ever retrieving a record. Hence, Thai discloses also discloses updating of a bitmap as separate operation from the retrieval of records.

### ***Conclusion***


12. The prior art made of record listed on PTO-892 and not relied, if any, upon is considered pertinent to applicant's disclosure.

***Contact Information***

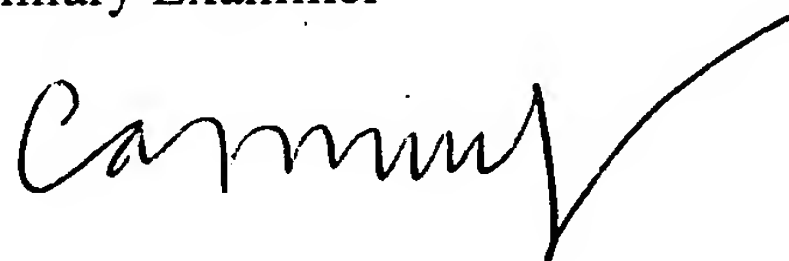
13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael D. Pham whose telephone number is (571)272-3924. The examiner can normally be reached on Monday - Friday 9am - 5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John Cottingham can be reached on 571-272-7079. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Michael Pham  
Art Unit 2167  
Examiner 

Cam Y. Truong  
Art Unit 2162  
Primary Examiner



John Cottingham  
Art Unit 2167  
Supervisor